ABSTRACT

The Guana Tolomato Matanzas National Estuarine Research Reserve is one of twenty-six such reserves in the United States established with the intent of protecting coastal estuaries through increased scientific understanding. GIS-based analysis of aerial photographs of the southern half of the reserve reveals high rates of erosion along the margin of the Atlantic Intracoastal Waterway which runs through the reserve. From 1970/1971 to 2002 nearly 70 hectares (approximately 170 acres) of shoreline habitat were degraded by erosion along the 64.8 kilometers of channel margin analyzed. Essential habitats including oyster bars and salt marshes were reduced to intertidal sand flats. Wakes generated by vessels in the Intracoastal are hypothesized to be the primary cause of this erosion. An examination of the relationships between lateral movement of the channel margin and factors with the potential to affect erosion and accretion supports this hypothesis. Exposure to boat wakes was found to be the causal factor most strongly correlated with rate of lateral margin movement. Margin movement rates were also found to vary significantly with exposure to wind waves and with the type of channel margin eroded. A reduction in nearshore wave energy appears to be necessary to allow the recovery of impacted ecosystems. Approaches to erosion management based on nearshore stabilization and regulation of navigation are discussed, and the public policy surrounding implementation of such plans is described.